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HIGHLIGHTS OF DINOSAUR ISLE MUSEUM 2023 - 2024:- RECENT PUBLICATIONS

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Since 2023, four new taxa have been described from the collection of Dinosaur Isle Museum: three new genera of dinosaur, and a new insect genus. This article highlights those studies, as well as further publications that focus on Dinosaur Isle specimens. Whilst our collection is cited or figured in numerous studies, the specimens are often only briefly mentioned and these papers have not been reviewed in this article.

IWCMS : 2023. 102 *Vectidromeus insularis*

Hypsilophodonts were small to medium-sized, bipedal ornithopod dinosaurs characterised by a relatively short snout, robust maxilla, and heterodont dentition. Their limb proportions—specifically, a relatively short femur in contrast with elongate tibiae, fibulae, and metatarsals—indicate a cursorial (adapted for running) lifestyle. These features, combined with cranial morphology, suggest hypsilophodonts were low-level browsers (Weishampel *et al*., 1990).

Hypsilophodon foxii, originally thought to be a juvenile iguanodont, was discovered near Cowleaze Chine on the southwest coast of the Isle of Wight (Martill & Naish, 2001). Reverend William Fox, a local amateur palaeontologist, argued that advanced skeletal co-ossification in the specimen indicated it represented a distinct, smaller species of *Iguanodon*. Although his observations were initially dismissed by Richard Owen (the founder of the Natural History Museum, London), Thomas Huxley later used Fox's specimen to formally describe the new genus and species *Hypsilophodon foxii* in 1869 (Martill & Naish, 2001).

Over the subsequent 150 years, numerous partial and near-complete skeletons of *Hypsilophodon* have been recovered from the same region. These specimens are typically found within a thin, silty mudstone near the top of the Wessex Formation. The abundance of individuals within this restricted stratigraphic horizon has led to interpretations of the layer as a flood deposit that may have entombed a herd of animals (Martill & Naish, 2001).

Vectidromeus insularis, a newly described small hypsilophodontid, is represented by a partial skeleton comprising dorsal and caudal vertebrae, elements of the pelvis, and hindlimbs (Longrich, 2023). Although the specimen is juvenile, it exhibits notable morphological differences from both juvenile and adult specimens of *Hypsilophodon* (Longrich *et al*., 2024).

Stratigraphically, *Vectidromeus* is derived from the base of the Wessex Formation and is approximately four million years older than the *Hypsilophodon* holotype. As such, it is likely that the two taxa were not contemporaneous (Longrich *et al*., 2023). Numerous indeterminate "*Hypsilophodon*" remains in the Dinosaur Isle Museum's collection span various horizons of the Wessex Formation; however, in the absence of overlapping material, they cannot be definitively assigned to either *Hypsilophodon* or *Vectidromeus*.

IWCMS : 1996.153 & IWCMS : 2021.75 *Vectipelta barretti*

Ankylosaurs were a group of small to medium-sized, squat, quadrupedal ornithischian dinosaurs, characterised by their extensive dermal armour. This ranged from small scutes to large spines, sacral shields, and in some derived taxa, tail clubs (Weishampel *et al*., 1990).

Ankylosaur remains have been recovered from the Isle of Wight since the mid-19th century (Blows, 2015). Following the description of a relatively complete specimen in 1865 *Polacanthus foxii* (Owen, 1865), numerous partial skeletons and isolated bones attributed to *Polacanthus* have been excavated. In the 1990s, a new ankylosaur specimen was uncovered and more recently described as a distinct taxon: *Vectipelta barretti* (Pond *et al*., 2023) (Fig.1).

Both *Polacanthus* and *Vectipelta* possess a sacral shield, a large flattened structure composed of co-ossified osteoderms overlying the pelvic region. When *Polacanthus* was first discovered, the sacral

Fig. 1: The remains of *Vectipelta barretti* laid out, with large spines in assumed positions. Smaller osteoderms, ribs and other fragmentary remains were not used in the reconstruction. Scale bar = 1 metre

shield was initially misidentified as the plastron of a large turtle due to its superficial resemblance (Hulke, 1881). In both taxa, dermal armour likely extended along the back and flanks, with larger spines positioned over the shoulders, decreasing in size posteriorly and laterally (Pond *et al.,* 2023).

However, *Vectipelta barretti* can be distinguished from *Polacanthus* by several morphological differences, particularly within the vertebral column. A phylogenetic analysis of *Vectipelta* has positioned it as a sister taxon to Ankylosauridae, indicating a closer evolutionary relationship to certain Chinese ankylosaurs than to polacanthids. This finding provides potential new insights into ankylosaur dispersal tns during the Early Cretaceous. However, this interpretation may be influenced by the fragmentary nature of the available material (Pond *et al*., 2023).

IWCMS : 2018. 44 *Eodortoka* cf. *morellana*

The origin of turtles can be traced to the Late Triassic, approximately 210 million years ago (Lyson & Bever, 2020). Over the course of around 70 million years, stem turtles gradually diverged from their diapsid ancestors. This evolutionary trajectory involved significant morphological changes, including trunk shortening, broadening of the ribs and gastralia, and the incorporation of metaplastic bone into the evolving carapace and plastron. These modifications culminated in the complete enclosure of both the pelvic and shoulder girdles within the shell (Lyson & Bever, 2020). Initial changes likely served to stiffen the trunk, enhancing forelimb power for digging, with swimming adaptations evolving later. It was only after the near-complete formation of the shell that it conferred additional advantages such as protection, structural support, camouflage, and buoyancy (Dziomber *et al*., 2020; Bu *et al*., 2020).

Turtle remains are relatively rare within the Wealden Group but are readily identifiable due to unique morphological traits. These include features such as the characteristic tubercles of *Helochelydra* shell, distinct sutures between the bones of the carapace and plastron, and stout, robust limb elements. As a result, turtle fossils are often distinguishable even among otherwise indeterminate material collected from beach exposures.

A recent discovery from the Wealden represents a relatively complete turtle specimen, preserving the carapace, plastron, vertebrae, scapulae, pelvic girdle, and limbs. This find marks the first documented occurrence of a dortokid turtle in the United Kingdom and represents the oldest known pan-pleurodiran in the country. Despite its completeness, the specimen lacks certain diagnostic features necessary for confident species-level identification and is therefore referred to as *Eodortoka* cf. *morellana*.

Lead–calcite dating of the specimen provides an age estimate of 127 ± 2.7 million years, placing the fossil within the Hauterivian stage. This represents the first radiometric date for the Wessex Formation and offers the most robust chronological constraint for its lower exposures.

This discovery contributes significantly to our understanding of pleurodiran evolution—a group that was once globally widespread but is today restricted to the Southern Hemisphere (Ferreira *et al.*, 2018). Furthermore, the radiometric data offer an important reference point for regional correlation and biostratigraphic studies within the Wealden Group.

IWCMS : 2014.80 *Comptonatus chasei*

Comptonatus chasei is represented by the most complete British iguanodontian skeleton discovered in over a century (Fig.2) and contributes significantly to the growing diversity of ornithopod dinosaurs identified from the Wealden Group on the Isle of Wight. Historically, the island's iguanodontians have been broadly classified into two morphotypes: the large, robust *Iguanodon*, and the smaller, more gracile *Mantellisaurus*. The addition of *Comptonatus* and *Brighstoneus simmondsi* introduces further taxonomic complexity, particularly among mid- to large-sized ornithopods, and raises important questions about the identity of isolated and fragmentary remains.

Although the skeleton of *Comptonatus* is relatively complete—with a broad representation of the major skeletal elements—taphonomic distortion is moderate, and some elements, such as the ribs, are incomplete. Interestingly, no rib was recovered in its entirety, with most preserved only as small, disarticulated fragments.

The fossil remains of *Comptonatus* were recovered from a bed situated high in the Wessex Formation succession, near its transition with the overlying Vectis Formation. In contrast, *Brighstoneus* was discovered in a lower stratigraphic position within the Wessex Formation, and *Mantellisaurus* was

Fig. 2 : An early reconstruction of *Comptonatus chasei* Image length = 7 metres

excavated from the Vectis Formation. Although all three taxa derive from the broader Wealden Group, their recovery from distinct stratigraphic horizons suggests they were not contemporaneous and may have been separated by several million years.

The stratigraphic position of *Comptonatus* is particularly significant for understanding iguanodontian evolution. Its occurrence near the top of the Wessex Formation places it close to the Aptian stage, a period marked by a notable increase in iguanodontian diversity. As such, *Comptonatus* provides valuable insight into the evolutionary trajectory and taxonomic differentiation of ornithopods during the Early Cretaceous.

IWCMS : 2023.124 *Worako yulei*

First recognised by Forbes in 1856, the Insect Limestone of the Isle of Wight is a globally significant conservation Lagerstätte - a geological unit that has unusual preservation, either in exceptionally high quality, or sheer number of fossils. This unit, part of the Insect Bed, consists of indurated calcareous mudstones that outcrop along the north coast of the Island between Bembridge and Thorness Bay. The limestone is interpreted as having formed in a hypersaline lagoon approximately 35 million years ago (Gale, 2019).

The fine-grained, alkaline muds of the Insect Limestone are capable of preserving fossils with exceptional detail, down to the micron scale (Ross, 2014), and occasionally even retain original colour patterning. The assemblage is remarkably diverse and represents a tropical to subtropical forest ecosystem (Ross, 2014), comprising a wide range of insects, other arthropods, vertebrates, molluscs, and plants.

Forbes (1856) compared the Insect Limestone to the insect-bearing limestones of the Purbeck Beds. However, the section he described at Forelands (Bembridge) is now known to be virtually unfossiliferous. It remains unclear whether Forbes collected fossils from the site himself, as no specimens were explicitly referenced in his work.

The first fossil insects were discovered by Edwin A'Court Smith at Gurnet (now Gurnard). In 1874, he published a brief note in *Nature*, and by 1879 had described fossil Branchiopoda (brine shrimp). The first insect formally described from the deposit was *Lithopsyche antiqua*, a butterfly exhibiting preserved colour patterning (Butler, 1889).

In the late 19th and early 20th centuries, Reverend Peter Bellinger Brodie and George William Colenutt conducted extensive collecting and research on the Insect Limestone, publishing numerous accounts and contributing to the impression that the deposit had been largely exhausted (Osborne White, 1921). After a period of limited activity, the site experienced renewed interest thanks to the efforts of Andy Yule, who over the past 30 years has assembled a significant collection.

Worako yulei represents the most recent addition to this assemblage—a new genus and species of planthopper (family Fulgoridae), identified from a well-preserved left forewing. Planthoppers are relatively large, often vividly coloured insects, most common in tropical regions. Typically slow-moving, they can make short hops and are characterised by proportionately large, broad wings that usually cover the length of the body.

An article by Nel & Ross (2024) highlights some recent discoveries made by Andy Yule: three exceptionally well-preserved dragonfly wings. Whilst they are not new taxa, they exhibit more, and different details to the type specimens, including sexual/intraspecific variation.

IWCMS : 2014.95 Spinosaur Brains

Ceratosuchops inferodios was described in 2021 based on a partial cranium and the mid/distal portion of the tail (Barker *et al*., 2021). A recent study of this specimen focuses on the braincase and associated cranial nerve canals, with the aim of investigating potential sensory adaptations.

Spinosaurids, the clade to which *Ceratosuchops* belongs, have frequently been hypothesised as semi-aquatic piscivores—or in some cases, fully aquatic active predators. These highly derived theropods share several characteristic features, including elongate skulls with retracted external nares, neurovascular foramina on the premaxillae (interpreted as pressure-sensitive sensory pits), numerous conical and unserrated teeth, and robust forelimbs (Ibrahim et al., 2020; Barker et al., 2021). The goal of this study was to determine whether such morphological specialisations were accompanied by comparable adaptations in the neuroanatomy.

Computed tomography (CT) scans of the braincase were used to generate 3D reconstructions of the endocast, providing an approximate representation of brain morphology and associated cranial nerves. The resulting data revealed that the neuroanatomy of *Ceratosuchops* was broadly similar to that of other non-avian theropods, lacking any significant deviation or specialised features.

This finding suggests that the ecological shift from a generalist carnivorous diet to a piscivorous lifestyle in spinosaurs did not necessitate major alterations to the brain or sensory systems. While the skeletal anatomy of *Ceratosuchops* indicates adaptations for a semi-aquatic niche, these changes were not paralleled by equivalent developments in neuroanatomy.

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